

Effect of the metformin on the osmotic resistance of red blood cells

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Metformin refers to the antidiabetic drugs of the biguanide group obtained from the Galega officinalis plant (French liana, or goat ruta). This drug has antitumor and geroprotective effect, while increasing the life expectancy of animals by 10-30%. Also, this remedy inhibits the development of unforeseen (spontaneous) or induced tumors in animals, depending on the dose of application and duration of treatment [1].

In this work the change in the osmotic resistance of erythrocytes in hypotonic (relatively physiological solution) NaCl solutions, containing metformin, was studied in comparison with the same hypotonic sodium chloride solutions that did not contain metformin. To assess osmotic resistance, the optical density of hypotonic NaCl solutions was compared (in decreasing concentrations 0.6, 0.5, 0.45, 0.4, 0.3, 0.2%), obtained after lysis of erythrocytes, on a СPhС-2 (КФК-2) photoelectric colorimeter with a green light filter in comparison with the optical density of a control solution of erythrocytes and physiological solution.

For the experiment, blood was taken from seventeen patients. Under the experimental conditions, metformin significantly reduced the erythrocyte osmotic resistance. Thus, the increase in hemolysis for a 0.6% NaCl solution was 0.4% and subsequently the growth rate increased and for a 0.2% NaCl solution was 15.1%.

Thus, it was found that the degree of hemolysis of erythrocytes (calculated as a percentage of the optical density of hypotonic solution relative to that in solution of erythrocytes in distilled water) in solutions containing metformin proved to be higher than in solutions that did not contain metformin. So, it was concluded that metformin reduces the osmotic resistance of the erythrocyte membrane.